No. 869,269. PATENTED OCT. 29, 1907.

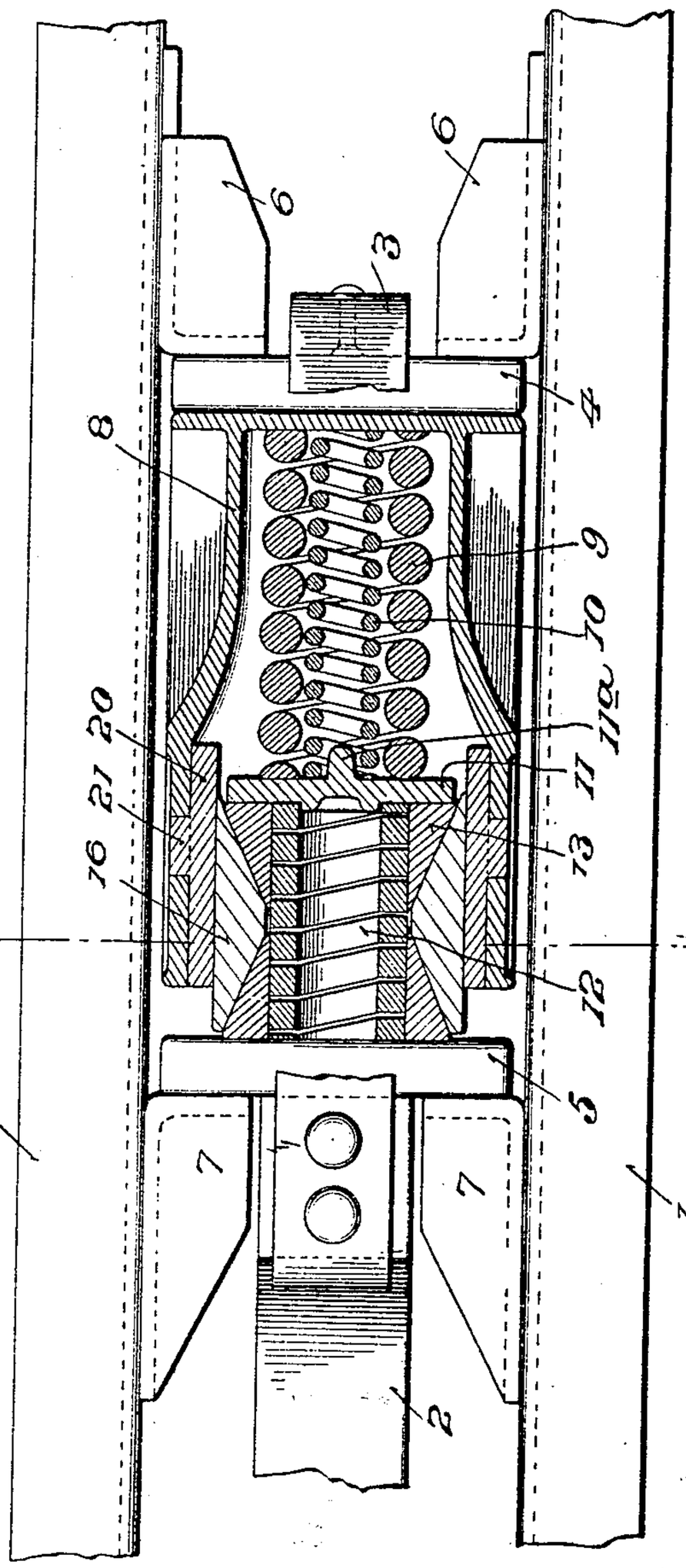
I. SIMPSON.

FRICTION DRAFT GEAR.

APPLICATION FILED JAN. 10, 1907.

2 SHEETS—SHEET 1.

FIG. 1.



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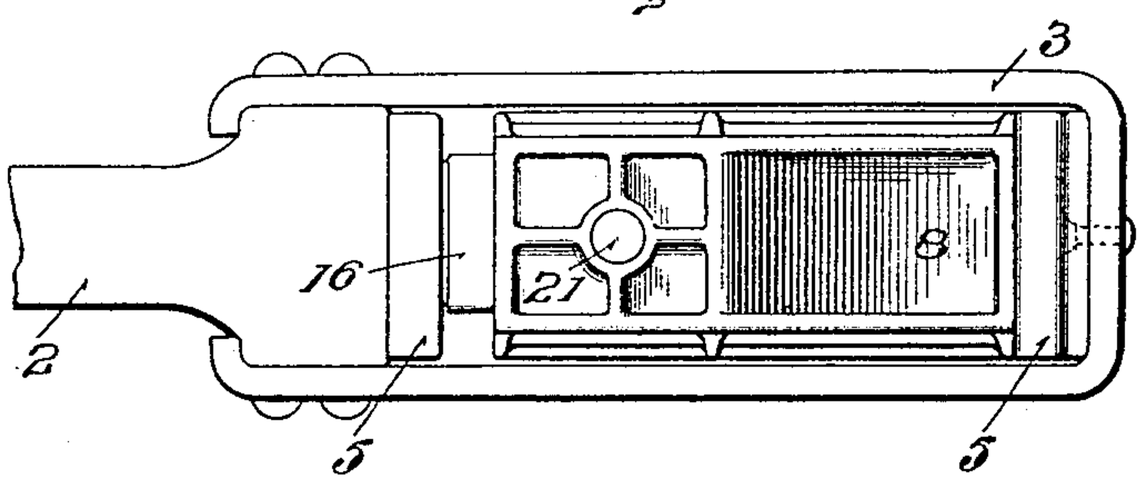
2 SHEETS—SHEET 2.

FIG. 2.



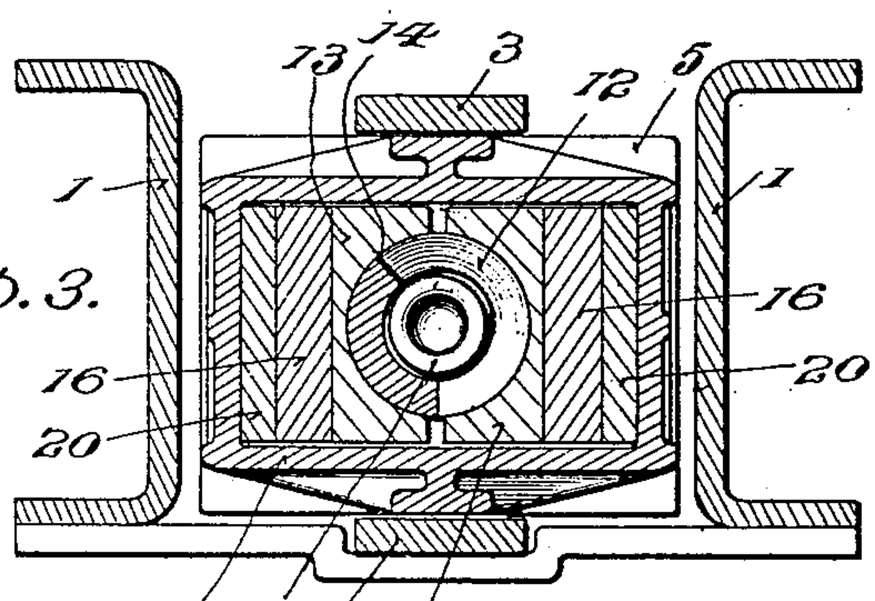


FIG. 3.

FIG. 4.

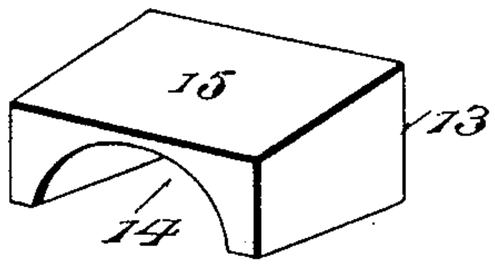


FIG. 5.

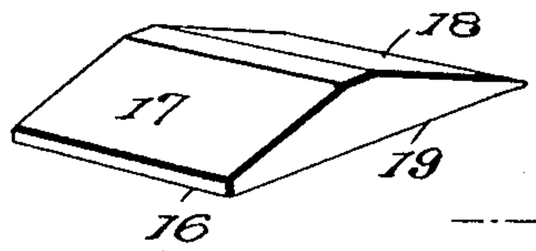


FIG. 6.

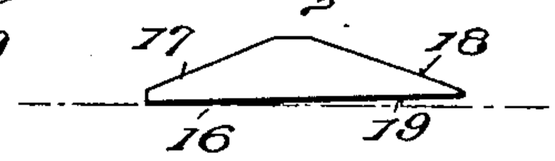


FIG. 7.

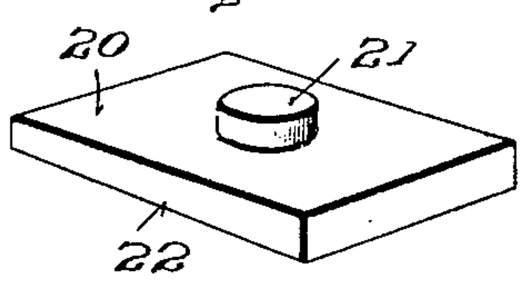


FIG. 9.

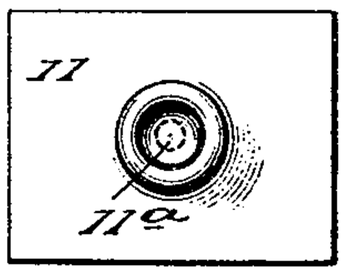
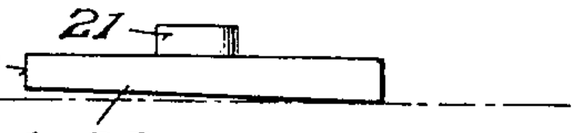


FIG. 8.



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FRICTION DRAFT-GEAR.

No. 869,269. Specification of Letters Patent. Patented Oct. 29, 1907.

Application filed January 10, 1907. Serial No. 351,728.

To all whom it may concern:

Be it known that I, ISAAC SIMPSON, a subject of the King of England, residing at Wilmerding, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Friction Draft-Gears, of which the following is a specification.

This invention has for its object an improved construction of friction draft gear which will combine to a high degree the characteristics of simplicity of structure, durability, and efficiency in dissipating or absorbing the severe buffs and stresses that are incidental to the handling of railroad cars.

With this object in view, the invention consists in certain constructions, arrangements and combinations of the parts hereinafter fully described and particularly pointed out in the appended claims.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a horizontal sectional view of my improved friction draft gear, a portion of the two center sills of a railroad car and the end of the door and its concomitant parts being shown in top plan view; Fig. 2 is a side elevation of my improved gear; Fig. 3 is a transverse sectional view on the line *x*—*x* of Fig. 1; Fig. 4 is a detail perspective view of one of the center wedge blocks; Fig. 5 is a similar view of one of the lateral wedge blocks; Fig. 6 is a detail side view of the same; Fig. 7 is a detail perspective view of one of the friction plates; Fig. 8 is a detail edge view of said plate; and, Fig. 9 is a detail perspective view of the division plate or partition employed between the posterior spring and the anterior spring.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

In the drawings, the numeral 1 designates the two center sills of a railroad car, 2 designates the draw bar to one end of which is secured the usual tail-strap or yoke 3, and 4 and 5 designate, respectively, two follower plates mounted within said yoke, and adapted to abut against the two pairs of abutment blocks 6 and 7, respectively, as shown best in Fig. 1.

Within the tail-strap or yoke 3, a preferably rectangular housing 8 is mounted. Within this housing are the posterior springs 9 and 10, one of which incloses the other, and one of which is preferably considerably larger than the other, as shown. These springs 9 and 10 bear at one end against the bottom or outer end of the housing 8, while at their other ends they bear against a division plate or partition 11 which may be provided with a nib 11^a accommodated by one end of the smaller posterior spring 10. On the other side of the division plate 11, there is mounted the anterior spring 12, the coils of which may be square in cross section or rounded if desired, although I preferably employ the square formation illustrated in the accompanying drawings. At its outer end, the anterior spring 12 bears against the follower plate 5.

Surrounding the anterior spring 12 are four center wedge blocks 13, which almost entirely encompass said spring as best seen in Fig. 3. Each of these blocks is provided with a concave side 14 fitting the spring and with an opposite tapered side 15, and the blocks are arranged with the tapers facing each other, as best seen in Fig. 1. In the normal position of the parts, the proportions are such that the blocks 13 lie flush with the ends of the spring 12 at the bases of said blocks, while their tapered ends or opposite edges are slightly spaced from each other. Two lateral or outside wedge blocks 16 embrace the four center wedge blocks between them, and each of these outside wedge blocks is provided with two wedge sloping faces designated 17 and 18, respectively, and adapted to bear against the tapered sides of the blocks 13, while the opposite or outside face of each block 16 is slightly tapered, as indicated at 19 and as best illustrated in Fig. 6.

Embracing the outside or lateral wedge block 16 are the friction plates 20, each of which is secured rigidly and preferably in a detachable manner within the outer or front end of the housing 8. In the present instance this means of connection is comprised by a boss 21 formed on the friction plate and fitting within a socket in the housing as seen in Fig. 1. These friction plates are made detachable, so that they may be removed whenever necessary and be replaced by others, or so that liners may be inserted between them and the housing to compensate for any wear that might result from long continued use of the draft gear.

In describing the practical operation of my improved friction draft gear, it is of course understood that in pulling stresses, the rear follower plate 4 moves towards the front follower plate 5, while in buffing stresses, the front follower plate moves towards the rear follower plate 4. This relative movement of the follower plates results in the consequent compression of the gear and upon such compression, pressure is brought to bear simultaneously upon the outer ends of the bases of the outermost center wedge blocks 13, and likewise upon the outermost end of the anterior spring 12. The resiliency of this anterior spring 12 causes the center wedge blocks 13 to tend to move longitudinally towards each other. Owing to

the force resulting from the resistance of pressure exerted on posterior springs 9 and 10 pressing against division plate 11, it is manifest that a solid resistance is offered at the inclined surfaces 15 of the center wedge blocks 13 from the movable lateral or outside wedge blocks 16, and consequently a powerful centripetal pressure is brought to bear on the outside of the coils of the anterior spring 13, as the said outside wedge blocks move longitudinally on the friction plates 20 rigidly secured within the rectangular housing 8 and the parts thereby being forced into a more circumscribed area. The resistance of this pressure or radial compression of the outside of the coils of anterior spring 12 forces the center wedge blocks 13 to move upon the inclined surfaces 17 and 18 of the outside wedge blocks 16, and in a direction away from each other longitudinally. This movement of the center wedge blocks 13 away from each other longitudinally is accompanied by the lengthening of the anterior spring 12 which is consequent upon or effected by the radial compression that is exerted by the center wedge blocks during the compression of the gear and the resistance to such radial compression brings direct pressure to bear upon the center wedge blocks 13 and by transmission to the lateral wedge blocks 16. The anterior spring 12 finds space whereby its lengthening is permissible, because the longitudinal resistance offered by the posterior springs 9 and 10 upon the outer wedge blocks 13 is less than the lateral resistance offered by the anterior spring 12. Hence the center wedge blocks must move apart longitudinally in order to allow the accommodation of the parts when compressed into a smaller area, and the distance increases between the front follower 5 and the division plate 11, thus there is no obstruction offercd to the lengthening of the anterior spring 12, and in fact, it is assisted in its lengthening by the said movement apart of the center wedge blocks, while said center wedge blocks are simultaneously compressing the anterior spring radially and moving apart longitudinally. The function performed by the posterior springs 9 and 10 in the compression of the gear is two-fold, namely, they admit of the complete traverse of the device, and they also control the radial compression of the anterior spring 12 by admitting of increased action other than that required in an actual travel of the gear, while at the same time, such posterior springs are not in any frictional contact radially with the friction parts. Pressure is also transmitted at the outer tapered faces 19 of the lateral wedge blocks 16 to the friction plates 20 between which, by continued compression friction is produced.

Thé traverse is ended obviously, when the outer end of the housing 8 and the follower plate 5 contact with each other, and upon the removal of the pressure from the draft gear, the recoil of the anterior spring 12 releases the pressure of the frictional parts and the posterior springs 9 and 10 force said frictional parts back again to a normal or complete released position.

From the foregoing description in connection with the accompanying drawing, it will be seen that I have provided an improved friction draft gear in which the pressure is produced on stationary friction plates in the movement of the wedge blocks upon the same and is not produced between the outside of the coils of the anterior spring and any friction wedge elements. In my device, the hollow frictional mechanism is employed in a more circumscribed area during operation and this movement is resisted and also pressure on the wedge blocks is resisted by the longitudinal action of the ordinary coil springs, to wit, the posterior springs, and said springs being in no circumferential contact with the wedge members. The radial resistance of the anterior spring 12, it will be seen, is exerted to force the center wedge blocks 13 to move apart longitudinally and this movement is resisted by the posterior springs. Consequently a powerful pressure is exerted upon the lateral wedge blocks 16 in the movement of which upon the friction plates produces the friction. The advantage of this arrangement and consequent operation of the parts resides in the fact that the anterior spring is not subjected to the fatal defect of being compressed radially and longitudinally at the same time and without compensating for releasing it from such position, because the yielding of said posterior springs permits the anterior spring to elongate, thereby insuring its safety against breakage and relieving it from any undue strain during the operation of the gear. Then again, the friction parts are early brought into operation by reason of a comparatively short preliminary action, with a result that a high frictional resistance is gradually developed early in the traverse of the gear, leaving a sufficient amount of travel to afford an ample dissipation or absorption of the shock by reason of a prolongation of the highly increasing frictional resistance.

Having thus described the invention, what is claimed as new is:

1. In a friction draft gear, the combination with a draw-bar, and its relatively movable follower plates, of a series of coil springs interposed between said plates, wedge blocks surrounding one of said springs, the other spring being free from frictional contact with said wedge blocks, and means for controlling the radial compression of said surrounded spring by the longitudinal resistance of the other through the instrumentality of said wedge blocks.

2. In a friction draft gear, the combination of a draw-bar and its relatively movable follower plates, of anterior and posterior springs, a housing in which said springs are contained, a division plate between the anterior and posterior springs, wedge blocks surrounding the anterior spring and located between the division plate and the front follower plate, friction plates secured in said housing and bearing against the wedge blocks, and means whereby radial compression of the anterior spring is controlled by the longitudinal resistance of the posterior spring and the coaction between the wedge blocks and said friction plates.

3. In a friction draft gear, the combination with a draw bar and its front and rear follower plates, of anterior and posterior springs interposed between said plates, a housing within which said springs are contained, a division plate between the anterior and posterior springs, center wedge blocks surrounding said anterior spring with their wedge surfaces facing each other, said blocks being located between the division plate and the front follower plate, a lateral wedge block having oppositely sloping faces adapted to engage the wedge surfaces of the center wedge blocks, and friction plates secured rigidly within the outer end of the housing and adapted to bear against the outer side of the lateral wedge blocks.

4. In a friction draft gear, the combination with a draw-bar and its front and rear follower plates, of anterior and posterior springs between said plates, a housing within which said springs are contained, a division plate between the anterior and posterior springs, center wedge blocks

surrounding said anterior spring with their wedge surfaces facing each other and with their ends bearing against the division plate and the front follower plate, respectively, center wedge blocks surrounding said anterior spring with their wedge surfaces facing each other, lateral wedge blocks having oppositely sloping faces adapted to engage the wedge surface of the center wedge blocks, and friction plates secured rigidly within the outer face of the housing and adapted to bear against the outer sides of said lateral wedge blocks, the coacting faces of the lateral wedge blocks and the friction plates being correspondingly tapered.

In testimony whereof I affix my signature in presence of two witnesses.

ISAAC SIMPSON. [L. S.]

Witnesses:

ABRAHAM L. GOLDSTROM,

EDMUND SIMPSON.